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Creating Snags With Explosives

Evelyn L. Bull, Arthur D. Partridge, and Wayne G. Williams

Abstract

The tops of ponderosa pine *(Pinus ponderosa)* trees were blown off with dynamite to create nest sites for cavity nesting wildlife. The procedure included: drilling a hole almost through the trunk, inserting the dynamite, and setting the charge with primacord and fuse. Trees were simultaneously innoculated with a decay organism. The average cost was $30 per tree.

Keywords: Birds, nesting, snags, wildlife habitat.

An increasing awareness of the importance of snags (dead trees) to wildlife, particularly cavity nesters (Jackman 1974, Beebe 1974, Balda 1975, Conner et al. 1975, Thomas et al. 1979, Mannan et al. 1980), has resulted in an interest in how to create snags. Trees can be killed by silvicide, girdling, and burning; however, we wanted a quick and safe method that would produce a facsimile of the dead trees woodpeckers use for nesting. In conifer forests, woodpeckers favored snags with broken tops and decayed wood (McClelland and Frissell 1975, Bull and Meslow 1977, Scott 1978, Raphael 1980).

Because there is widespread interest in creating snags, we feel that it is appropriate to share our experiences in topping trees. Removing the tree top with explosives created a snag susceptible to decay and similar to those trees used by cavity nesters. It remains to be seen if the snags created in this manner are used by cavity-nesting birds, although woodpeckers readily foraged on them (fig. 1).

Initially we felled one ponderosa pine (30-cm diameter) and experimented with different methods of shearing: (1) insert one stick of explosive in a 3.3-cm-diameter hole, (2) insert two sticks set in parallel holes 5 cm apart, and (3) tape six sticks opposite and 8 cm above the first stick. We used two types of explosives: sticks (each 226 gm) of cased water gel (Tovex 100 water gel, Dupont)[1] or 45 percent dynamite (Amogel, Apache). All methods sheared the

[1] Mention of product or trade names does not imply endorsement by the U.S. Department of Agriculture.

EVELYN L. BULL is wildlife biologist, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, LaGrande, Oreg. ARTHUR D. PARTRIDGE is at the University of Idaho, College of Forestry, Moscow. WAYNE G. WILLIAMS is range research technician, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, LaGrande, Oreg.

Figure 1.—Black-backed three-toed woodpecker foraging on the trunk of a topped tree.

tree, but the least disruption to the wood resulted with one stick of dynamite. The other methods destroyed 0.5-1 m of stem and threw large pieces of wood that were dangerous to workers and damaged surrounding trees.

After these preliminary tests, we selected the dynamite in a single hole as the method to top 100 ponderosa pine trees ranging from 15- to 75-cm diameter at breast height. Tops were removed at 5-20 m above the ground (figs. 2 and 3).

The procedure involved climbing the tree, drilling the hole, innoculating the hole with decay organisms, and setting the charge. Tree spurs or ladders were used for climbing. Ladders worked better for heights less than 15 m and on trees with few limbs along at least one side of the trunk. We recommend that climbers have training in the use of the climbing equipment.

We drilled almost through the stem, leaving wood that acted as a hinge to insure that the top fell clear. We used a 1.3-cm-capacity electric drill with a specially constructed 2.2-cm-diameter drill bit. A portable 110-volt generator provided power. Slow-speed drills are recommended because they develop less torque than high-speed drills and are safer to use with large diameter drill bits.

Trees were innoculated with a common wood-decaying fungus *Polyporus anceps* by inserting a 2.5-cm probe with the dynamite. The probes were infested by placing them in a flask containing sterile 1.5 percent malt extract, water, and a pure fungus culture. The flask remained on a rotating shaker until fungus growth was obvious on the wood. The liquid was drained, and the fungus was permitted to grow. Probes were infested 3 weeks prior to use.

Figure 2.—Tree being sheared by dynamite and chunks of wood being thrown.

Figure 3.—Ragged top is characteristic of those trees sheared with dynamite.

Generallly, we put one dynamite stick in a hole. In trees with holes deeper than 25 cm, two sticks were inserted end to end. Each charge was primed by running at least 7 cm of knotted primacord (Ensign Bickford, E-Cord) into a hole made by a crimping tool in the dynamite. The primacord was strung to the ground and connected to primacord from adjacent trees similarly prepared. A No. 6 blasting cap, connected to at least 1 m of fuse (Safety Fuse — burning rate approximately 110 seconds/m at 100-m elevation), with igniter cord inserted in the slit distal end, was firmly taped to the end of the primacord. The fuse was ignited with a butane lighter to ensure lighting under adverse weather conditions.

We encountered several problems with the blasting. Tree tops sometimes tangled in the canopy and required additional blasting, sawing, or winching to get them down. Multiple sets of more than four caused problems because falling tops pulled the primacord out of sets not yet discharged. Charges set in decayed wood did not shear the tops. Dead wood did not give sufficient blast

resistance to make a cut. If dead wood is encountered, select a location in sound wood or triple the charge.

With a crew of four people, two climbing and two moving equipment, we topped an average of 15 trees in an 8-hour day. Twenty-five trees were done in each of four 5-acre plots; plots were less than 10 km apart so travel time was minimal. The cost of the explosives averaged $3 a tree; and the total cost per tree, for equipment and labor (at $10/hour), averaged $30.00.

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